1,198,439

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,198,439

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COMPLETE SPECIFICATION

Safety Arrangements for Motor Operated Windows in Road Vehicles

We, JOSEPH LUCAS (INDUSTRIES) LIMITED, of Great King Street, in the City of Birmingham 19, a British Company, do hereby declare the invention for which we pray that a patent may be granted to us. and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to safety arrangements for motor operated windows in road vehicles.

An arrangement according to the invention includes a switch associated with the fixed frame of a window, so that the switch is actuated in the event that an obstruction is placed between the window and the fixed frame whilst the window is being raised. and means operable upon actuation of said switch for both breaking the circuit to the motor and short-circuiting the motor.

In the accompanying drawings,

Figure 1 is a sectional view of part of a power operated window used in an assembly according to one example of the invention,

Figures 2 and 3 respectively are circuit diagrams of alternative circuits for operating the window, and.

Figure 4 is a sectional view illustrating an alternative form of switch to that shown in Figure 1.

Referring first to Figure 1 there is provided a fixed conductive window frame 11 which is of inverted U-shaped cross-section and which extends along at least the top edge of the window aperture in the door of the vehicle. The base of the frame 11 carries a rubber strip 14 on which is mounted a conductive strip 14*a*. Slidable in the U-shape of the frame 11 and electrically connected thereto is a conductive part 12. also of inverted U-shaped cross-section. the part 12 being spaced from the strip 14*a* by rubber buffers 13, and projecting downwardly from the frame 11. A draught exclusion strip is mounted within the part 12 so as to grip the upper edge of the window pane when the wndow is in its closed position. In normal operation of the window, when the window is closed the switch 15 defined by the part 12 and the strip 14*a* is open and the upper edge of the window pane seats in the part 12. However, if an obstruction is placed between the window pane and the part 12 as the window is raised the part 12 will be forced inwardly against the action of the rubber buffers 13 so that it engages the strip 14*a* and so closes the switch 15.

Referring now to Figure 2, the switch 15 is connected in series with a relay coil 21 across the battery 31 of the road vehicle with which the window is associated. The negative terminal of the battery is connected to the movable contact 32 of a control switch, the contact 32 being movable from its neutral position shown into engagement with fixed contacts 33 or 34. The contact 33 is connected to the positive battery terminal through a series circuit including a pair of normally closed contacts 22 of the relay 21, a field winding 18 of the motor which operates the window, and the armature 17 of the motor. The contact 34 is connected to the positive battery terminal through another field winding 19 on the armature 17.

When it is desired to lower a raised window, the contact 32 is moved into engagement with the contact 34, so completing a circuit to the winding 19 and armature 17 in a manner to lower the window. When it is desired to raise the window. the contact 32 is moved into engagement with contact 33. so energising the winding 18 and armature 17 through the contacts 22. If the switch 15 is actuated by an obstruction. it

closes so energising the relay 21, which opens the contact 22 to break the circuit to the motor, and at the same time closes a pair of normally open contacts 23 connected across the winding 18 and armature 17, so short-circuiting the winding 18 and armature 17 to contribute dynamic braking.

Figure 3 shows an arrangement similar to Figure 2 for use with a permanent magnet motor. In Figure 3, parts equivalent to those in Figure 2 are designated with the same reference numerals, and it will be seen that, in addition to the omission of windings 18, 19, the contact 32 is replaced by a pair of ganged movable contacts 32*a*, 32*b* which when it is desired to raise the window are moved into engagement with fixed contacts 33*a*, 33*b*, and which when it is desired to lower the window are moved into engagement with fixed contacts 34*a*, 34*b*. The two pairs of fixed contacts are oppositely connected to the motor 17 so as to operate it in opposite directions respectively, and the contacts 22 and 23 operate in exactly the same way as in Figure 2.

In both Figures 2 and 3 the contacts 23 contribute dynamic braking, but the circuit can be re-arranged so that the contacts 23 stop the motor and then actually reverse the direction of operation of the motor, so that the window is lowered.

The switch 15 could of course take a variety of forms. For example, it could be constituted by a sealed tube compression of which would operate a pressure switch. Figure 4 illustrates another form of switch, in which the upper part of the frame 11 has a rubber block 25 mounted therein. The block 25 is recessed along its upper edge and a conductive flexible strip 26 is mounted in the recess in the block 25. The block 25 projects from the lower edge of the frame 11 so that any obstruction serves to compress the block 25 inwardly to close the switch 15 defined by the strip 26 and the frame 11. The switch 15 is incorporated in the circuit of Figure 2 or Figure 3.

It will be appreciated that since the block 25 and strip 26 are flexible they can extend around the periphery of the frame 11 rather than just along the upper edge thereof. This construction is particularly useful in window arrangements utilizing non-rectangular window panes where in a gap is left at the sides as well as at the top of the window pane when the window pane is lowered.

WHAT WE CLAIM IS:—

1. A safety arrangement for a motor operated window in a road vehicle, including a switch associated with the fixed frame of a window, so that the switch is actuated in the event that an obstruction is placed between the window and the fixed frame while the window is being raised, and means operable upon actuation of said switch for both breaking the circuit to the motor and short-circuiting the motor.

2. An arrangement as claimed in claim 1 in which said switch operates a relay having one contact which breaks the circuit to the motor and another contact which short-circuits the motor.

3. An arrangement as claimed in claim 2 in which said relay also reverses the direction of operation of the motor.

4. An arrangement as claimed in any one of the preceding claims wherein the movable part of said switch is in the form of a flexible member which extends along the top edge of the fixed frame of the window.

5. An arrangement as claimed in claim 4 wherein said flexible member extends along at least one other edge of the fixed frame of the window in addition to said top edge.

6. A safety arrangement for a power operated window in a road vehicle comprising the combination of parts arranged and adapted to operate substantially as described with reference to the accompanying drawings.

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1 SHEET

COMPLETE SPECIFICATION

This drawing is a reproduction of the Original on a reduced scale.

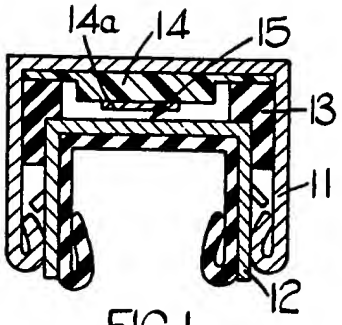

FIG.1.

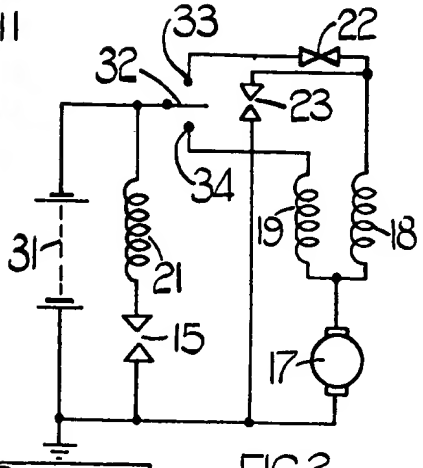

FIG.2.

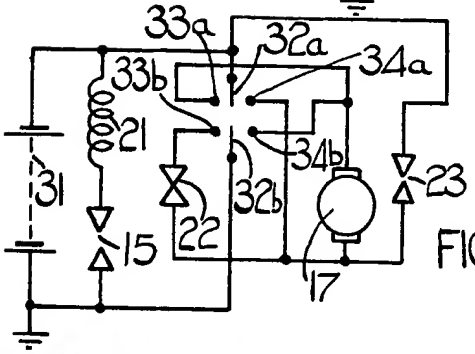

FIG.3.

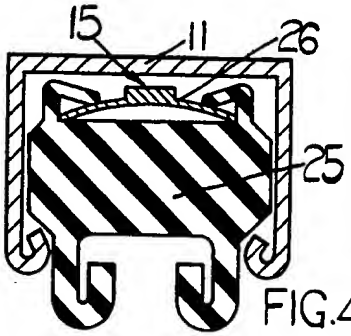

FIG.4.

Commissioner for Patents
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May 6, 2003

Applicant: Hofmann, Knut
Serial No.: 09/937,083
Date Filed: September 21, 2001
Title: SHAPED SEAL FOR SEALING A POWER-OPERATED CLOSING DEVICE

Transmittal of Form PTO/SB/08A including copies of cited references listed thereon, a Transmittal Form and Return Post Card is hereby received and acknowledged.

Flugel Preissner Kastel\85934.000008\SBS